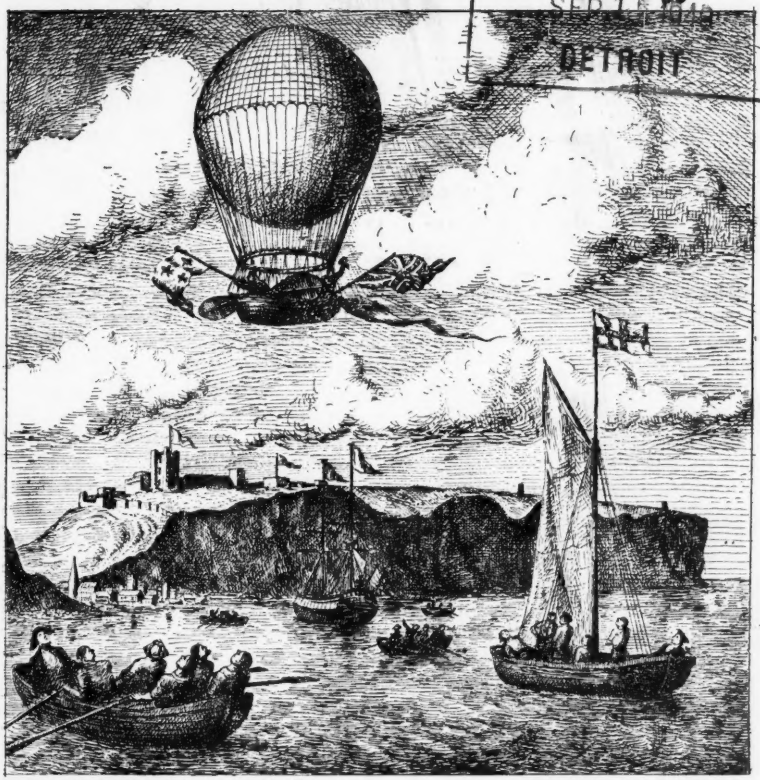
Light and Lighting

Vol. XLII.—No. 8 August, 1949 Price - One Shilling

SEP 14 1949
DETROIT



FIRST CHANNEL CROSSING BY AIR. A representation of the departure of Monsieur Blanchard and Dr. Jefferies from Dover Castle on January 7th, 1785. This was the first occasion on which the English Channel had been crossed by air.

FIRST IN THE LIGHTING FIELD.

The Lighting Service Bureau was the first institution of its kind. Established by the Electric Lamp Manufacturers' Association in 1924, it is today widely recognised as the most reliable source of lighting information. **The Lighting Service Bureau is maintained by the Electric Lamp Manufacturers' Association.**

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THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

A

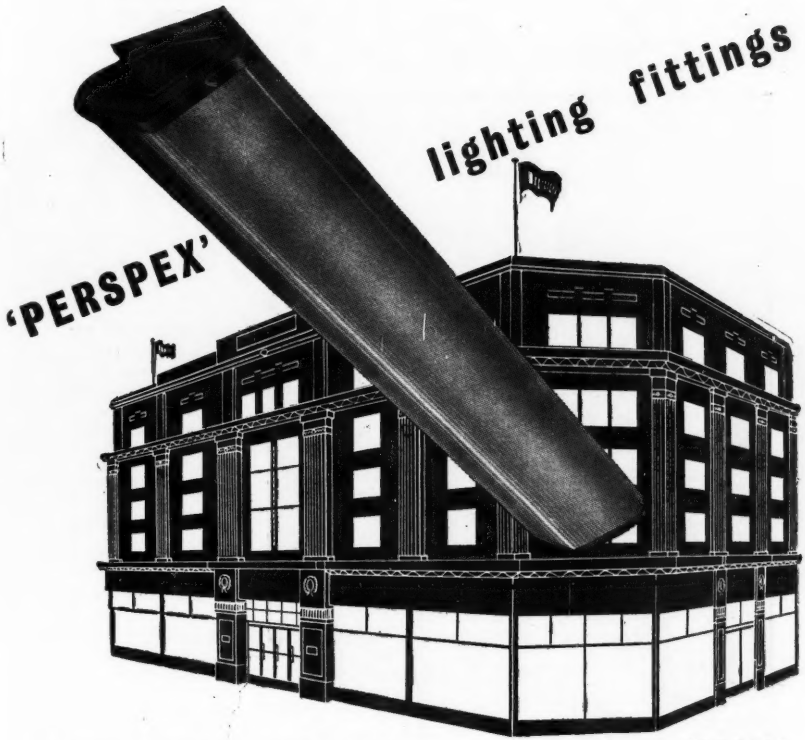
Transformation.

Reproduced by courtesy of the Victoria and Albert Museum.

While this hundred-year-old drawing of Millbank shows how London's river frontage has changed, the transformation here is no greater than that which electrical developments have produced in our mode of living.

When electric lighting was first introduced, no one could have visualised that it would reach such a peak of excellence in so short a time. This progress could not have been achieved without the co-operation of members of the Electric Lamp Manufacturers' Association, who, by pooling their resources and working constantly to improve their product, make available lamps of the highest quality which conserve fuel and raw materials, now so vital to the national effort.

The Lighting Service Bureau is maintained by the Electric Lamp Manufacturers' Association



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P.338

B

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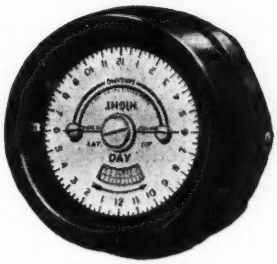

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The 1949 I.E.S. Code

EVERYONE who drives a motor vehicle in this country needs a licence to do so, and cannot get it without satisfactorily answering a number of questions relating to fitness for the "job." One question concerns the applicant's knowledge of the Highway Code. If everyone who undertakes lighting were asked if he is familiar with the I.E.S. Code we have no doubt that many would still have to reply in the negative. But, just as a knowledge of the rules of good driving is expected of all those who want to drive on our roads, so a knowledge of the rules of good lighting ought to be expected of all those who essay to light our various buildings. Much bad lighting may never be perpetrated if more lighting practitioners become familiar with the I.E.S. Code. We are pleased to note that a new and improved edition of this valuable publication is now ready (see p. 194), and we hope it will have a wide circulation.

Illumination Notes and News

Public and Private

Growing consciousness of the amenity value of good lighting is evidenced by references to lighting in two recent broadcast talks. One of these talks was in defence of what was termed the old-style "pub"; the other dealt with the properties which went to make an attractive room in a home.

Talking about "pubs," the speaker deplored the modern tendency to go in for plastics and chromium with "acres of bare floor blinking in the shadowless glare of the latest factory lighting." By this the speaker may either mean that he objects altogether to the use of fluorescent lighting in hostelries or, and this would be a far more plausible comment, he protests against the use in such places of fluorescent lamps in unsuitable fittings, such as industrial reflectors. Industrial reflectors can hardly be called things of beauty at any time, and used out of their proper sphere they can do much harm to the cause of good lighting—and when used in the "local" they become what Grenfell Baines in his paper to the I.E.S. called "hanging architectural apparitions."

It is possible, and indeed probable, that the speaker was condemning fluorescent lighting in "pubs" on the above grounds. But in the hands of the lighting artist this form of lighting can be adapted to fit into the interior architecture of most "pubs" without giving offence, though we would agree that there are a few inns where other forms of lighting would be more suitable.

Lighting engineers know that fluorescent lighting is not suitable for every lighting application, and it is their role to advise on the best form of lighting for any particular job. If those responsible for installing new lighting, whether it be a large or small installation, would take the little extra trouble to get competent advice there would be far fewer unsightly installations than there are to-day.

In the talk on what makes a good room the speaker said that in his opinion the two most important factors are proportion and lighting, by which he appeared to mean day-lighting. "Lighting," he said, "in combination with proportion can make a very simple room into something like a poem. In nearly all ordinary houses the day-lighting is more or less bad. The sills are too high or too low, long rooms are lit by windows plumb in the middle of one end—the worst possible place; small rooms are over-lit, large rooms under-lit, and in nine cases out of ten the position of the windows is made to fit the outside pattern of the house instead of being related to the requirements of each room. Really beautiful day-lighting is an elusive thing—wonderful when it is successful, and I have been struck how sometimes it happens by accident. I saw, not long ago, an attic room in an old house which has been extemporised out of two old servants' bedrooms thrown together. One

window was a horizontal rectangle, the other square and jammed in a corner. Those two windows, in combination with the shape of the room which narrowed abruptly inward near the door in an unexpected way, were quite perfect. Not a single dimension was wrong. There was variety within a completely harmonious unity, and all done by—pure chance."

The case quoted by the author may have been arrived at by "pure chance," but we feel that equally satisfactory results can be obtained by the architect's design, provided he knows what he wants to do with the natural lighting at his disposal. In such cases the architect is as much a lighting artist as the lighting engineer who has the job of maintaining the beauty of the room under artificial light.

Illumination of Snellen Charts

In the note on this subject, published in our last issue, the final paragraph implies that no standards of illumination for Snellen charts have yet been proposed. Sir John Parsons reminds us, however, that many years ago, at his instigation, a Committee of the Council of British Ophthalmologists (now merged in the Faculty of Ophthalmologists) issued a report with standards. These standards were subsequently revised by another Committee. It may be recalled that Sir John made reference to this in his address on Light and Vision, following the Annual General Meeting of the I.E.S. in 1943 (Trans. I.E.S., Vol. VIII, No. 6, 1943). We understand that an approach to the Faculty of Ophthalmologists has recently been made on behalf of the I.E.S. Code Committee with a view to joint discussion of this matter. Ultimately, it is intended to include agreed standards in the Code Schedule of Recommended Values of Illumination. No doubt a re-issue of standards by the Faculty will be valuable, for there is reason for believing that, in practice, suitable standards are not invariably used and maintained.

Forthcoming Conferences

Two important annual events in the lighting world take place about this time of year; firstly the conference of the Association of Public Lighting Engineers and, secondly, the National Technical Conference of the American I.E.S.

The A.P.L.E. meeting is this year to take place at Llandudno from September 12 to 16. The Conference opens on the afternoon of the 12th with the Annual General Meeting of the Association, which is followed by the official opening of the conference by the Chairman of Llandudno U.D.C., and the induction of the new President, Mr. A. S. Tapsfield. Papers to be presented at the meetings include contributions from Mr. F. C. Smith, who will be discussing the question of "Code or Specification," Mr. J. A. Prowse on recent developments in street lighting, and an address by the I.E.S. President, Mr. J. M. Waldram on "Roads Abroad and their Lighting." A most interesting paper should be that by Mons. L. Gaymard on "Public Lighting and Aesthetics," a subject on which he is known to have decided views. A full report on the conference will appear in these pages in due course.

The American I.E.S. Conference is to take place from September 19 to 23 at French Lick, Indiana. The programme of technical papers is formidable—some 34 papers are to be presented and are grouped according to subjects, such as light sources, street lighting, colour, etc.

The opening session on September 20 includes the presentation to Ward Harrison of the I.E.S. Gold Medal, an award which is richly deserved.

The I.E.S. Code—1949 Edition

The I.E.S. Code for the Lighting of Building Interiors (known more briefly and widely as "The I.E.S. Code") was first published as "Recommended Values of Illumination" in 1935. Since that date it has undergone a number of changes, and in the form in which it has just been republished it has been given greatly added dignity and the illumination charts have been considerably increased in their usefulness.

The Code is a set of rules and recommendations for good interior lighting, and is intended for the reference of those concerned with lighting practice and as a guide to the user in stating his lighting requirements.

The Code in its earlier form is a widely-known and valued publicaton of the I.E.S. The new Code makes its appearance in a distinctive red stiff cover and is printed throughout on art paper. By using art paper better reproduction of the diagrams has been obtained, and it has also been possible to print the notes on the assessment of illumination required on the pages next to the illumination charts instead, as in previous issues, at the end of the booklet.

The most striking feature of the new issue is in connection with the illumination charts themselves. Following the example set in Mr. Weston's book, "Sight, Light, and Efficiency" (which is included in Messrs. H. K. Lewis and Co.'s announcements of new books), the illumination scales are overprinted on a green background, which is graduated vertically as to size of detail and horizontally as to contrast. Besides reminding the user of the Code that colour as well as brightness-contrast has to be taken into account when finding the illumination required for any particular purpose, the coloured background gives conspicuity and a pleasing appearance to the charts. It may be added that the sizes of detail and the degrees of contrast represented in the coloured background are illustrative and not "true to scale"; though, so far as size is concerned, the types used approximately indicate the fineness of work in the different code categories. It is less easy to deal faithfully with grades of contrast by means of half-tone printing.

Only minor amendments, chiefly to the section dealing with lighting in offices, have been made to the schedule of recommended values of illumination.

A useful addition to the Code is a list of British Standards on illumination and lighting fittings. (Incidentally, the pages of the Code are now the same size as British Standards.)

The Code is now priced at 2s. 6d. net, post free. We understand that advance orders for some 2,000 copies were received before the full edition was printed, but the I.E.S. is now able to supply copies without delay, and it would appear that the demand for them is likely to be considerable.

Obituary

PRESTON S. MILLAR.

It is with deep regret that we announce the death, in New York on June 17, of Mr. Preston Millar, who was a prominent figure in international lighting matters. He was 69 years of age.

Mr. Millar began his career in illuminating engineering in 1897, and rose in 1929 to President of the Electrical Testing Laboratories, the position he still held at the time of his death. He was one of the founders of the American Illuminating Engineering Society, and was its President in 1913. He received the I.E.S. Gold Medal in 1945 for his contributions to the art and science of illumination, particularly in the fields of light measurement and street lighting.

He was President of the American National Illumination Committee from 1936 to 1948, and was present at last year's meeting in Paris of the International Commission.

By his death our American colleagues have suffered a great loss, as also has the International Commission and the lighting industry as a whole. The sympathy of his many friends will go to Mrs. Millar in her sad loss.

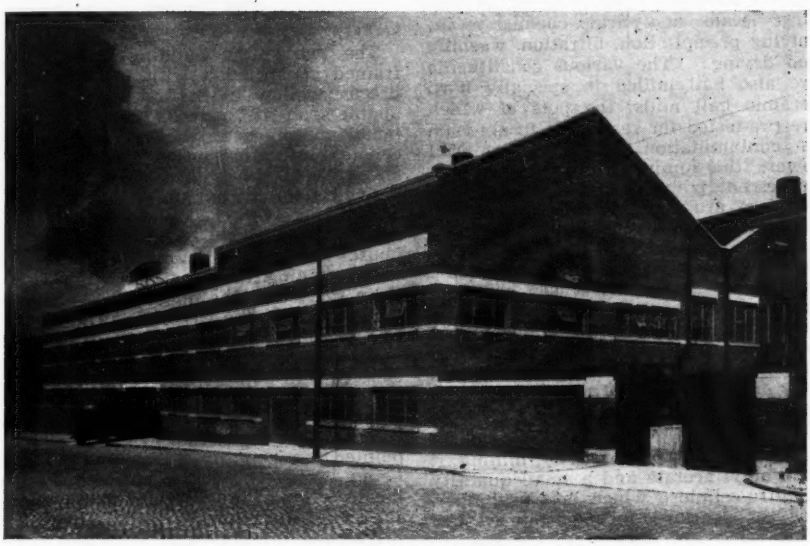


Fig. 1. The exterior of the factory.

The Manufacture of Fluorescent Lamps

Description of a Functionally Designed Factory

By P. D. OAKLEY,* B.Sc., F.R.I.C., M.I.W.M.

A factory concerned with the production of electric lamps should itself be an example of good lighting both natural and artificial and also of modern principles of industrial decoration which make the most effective use of good lighting. An attempt has been made to achieve all this in connection with the Siemens fluorescent lamp factory in Fylde-road, Preston, which is the subject of the present article.

To cope with post-war extension of fluorescent lamp production, most electric lamp manufacturers have had to be content to adapt either their existing buildings or some ex-Government factory. In the case of the Preston Works, the former alternative was not possible owing to limitations of space, and the latter course not being favoured, a special factory was designed and built. The principal reasons for the decision were the availability of local labour, the desire to maintain unity of production and technical control and the fortunate proximity of an appropriate site within 600 yards of the main factory. The site had been occupied by a somewhat derelict foundry which at one stage of the search for suitable accommodation had been rejected: when, however, its potentialities for erecting a new building were reconsidered, it proved admirable for the purpose.

* Works Manager, Siemens Electric Lamps and Supplies, Limited, Preston.

The Process

The process of manufacturing fluorescent lamps comprises briefly,

1. Fluorescent powder preparation,
2. Tube coating,
3. Lamp manufacture.

In powder preparation there are

certain chemical operations rather like large scale analytical chemistry involving precipitation, filtration, washing and drying. The various constituents are also ball milled in specially hard ceramic ball mills, the pots of which are pre-tested for resistance to abrasion as contamination by inert material lowers the luminous efficiency of the fluorescent powder. After milling, the powders are furnaced for the appropriate time at carefully controlled temperatures and in the course of this baking a considerable amount of fume is evolved. For this reason gas fired muffles are preferred to electrically heated ones since the windings of the latter are quickly corroded. Furnaced material is ground and sifted through very fine mesh vibrating sieves of the order of 200 meshes per inch.

Prior to tube coating a suspension of the powder is prepared by milling it with amyl acetate and a small quantity of nitro-cellulose which acts as binder. For the coating process clean washed glass tubes are filled with the suspension which, after draining and drying, leaves an even, firmly adherant coating of fluorescent powder. Coated tubes are fired at about 550 deg. C. to decompose the nitro-cellulose binder and straighten them. The firing machine consists of an electrically heated oven through which the tubes are carried on revolving, heat resistant rollers. All the plant for washing, coating, drying and firing was specifically designed for the purpose. The remaining processes of lamp making have much in common with incandescent lamp technology from which they have been developed. Briefly they comprise flange making, "foot" making, electrode assembly, sealing-in, exhaust, capping, soldering, ageing, testing and packing. While full use has been made wherever possible of standard types of incandescent lamp making equipment, the plant for the major operations had to be redesigned for fluorescent lamps. A notable example of this was the automatic exhaust machine, but the same applied to the less complicated machines such as that for capping and ageing. Testing for physical dimensions, particularly overall length of lamps with bi-pin caps necessitated the construction of expensive gauges as the permissible tolerance for all nominal lengths between 18 in. and 4 ft. is only $\pm\frac{3}{64}$ in.

The Factory

General Design.

The two storey building is of steel framed construction with brick filling, precast hollow block first floor and a double span roof covered with protected metal and lined on the underside with cellotex insulating board. The factory is electrically heated for reasons explained later. The total floor area is approximately 50,000 sq. ft. The ground floor, which is some 12 feet high, houses raw material stores, laboratories, tube washing and coating rooms and main services. The upper floor is lofty, being 16 ft. to the eaves rising to 32 ft. at the ridge and comprises the main lamp manufacturing area together with canteen and conference room. As will be seen in the photograph (Fig. 1), externally, the façade to Fylde-road is simple, pleasing rustic brick facings pointed horizontally in white cement being broken by stone sill and head bands. Impartial observers agree that this new building has markedly brightened up that part of Fylde-road where it is situated, and railway travellers from Preston to the north obtain a fleeting view of it as they pass close by the western gable end.

At a very early stage in the discussions with the architect a functional design was established which combined suitability with flexibility. Events proved the wisdom of this, particularly in relation to the lay-out of the laboratories which were originally intended for manufacture of cadmium chlorophosphate and magnesium tungstate, but actually produce calcium halophosphates as technical developments which matured after building operations were in progress led to a complete change in manufacturing procedure.

Ground Floor

The ground floor (Fig. 2) is divided into two roughly equal halves by a main corridor, on one side of which lies the glass and chemical stores, the electrical sub-station, and switchgear room. On the other side are the laboratories, furnace room, mixing room, tube washing and drying and coating room. The general direction of flow of the powder preparation is towards the western end where are situated the mixing room and the coating room to which the glass tubing is also brought after washing and drying. Coated tubes are transported

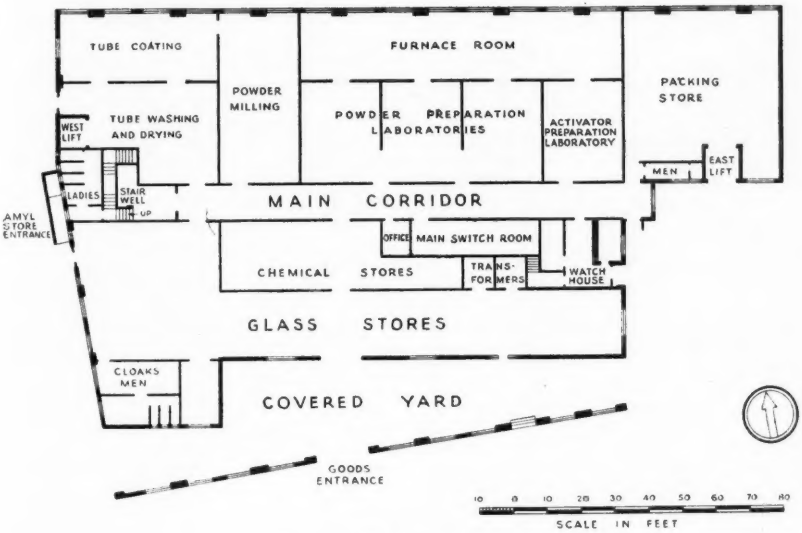


Fig. 2. Plan of ground floor.

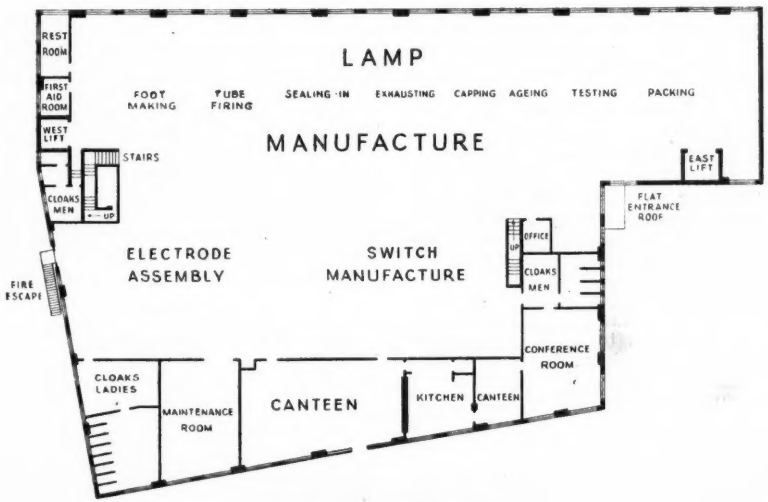


Fig. 3. Plan of Upper floor.

up the lift to the lamp manufacturing section. Special precautions against fire are incorporated in the mixing and coating rooms by covering all doors with asbestos and using only flame-proof electrical equipment.

Upper Floor

The upper floor is constructed of precast concrete beams covered with granolithic finish and in general is designed for a superimposed load of 1 cwt. per sq. ft., but in certain selected areas intended for heavy machinery the steel work is specially strengthened to permit a loading of 2 cwt. per square ft.

The general direction of flow (Fig. 3) is from west to east so that the coated tubes arriving by the west lift are fired, sealed-in, exhausted, capped, aged, tested, and packed ready for dispatch down the east lift. These hot processes are arranged as far as possible on the window (north) side, but if the factory eventually houses the three complete manufacturing lines for which it was designed they will occupy about half the available floor space, the remainder being allocated to electrode assembly and starter switch manufacture. On this floor, too, are located the canteen, staff dining-room and conference room, the women's cloakrooms and lavatories, first-aid and rest rooms. Office accommodation has been strictly limited, as all administration other than direct supervision is from the main factory at Dock-road.

Electricity Supply

The supply to the factory main switchboard is 416 volts 3 phase and neutral from two 1,000 KVA 6400/416 volt transformers which are the property of the North-Western Electricity Board and are installed in suitably placed transformer houses on the ground floor.

A metal-clad floor-mounting combination fuse-switchboard is installed in a room adjacent to the transformer houses and so placed as to be convenient for distribution throughout the factory. The switchboard comprises two sections, each equipped with 1,500 amp. T.P. and N. incoming isolators and metering equipment: all outgoing circuits are provided with ammeters.

The two sections of the board are joined by a 1,000-amp. T.P. and N. bus section isolator which is interlocked with the incoming isolators in such a manner that any two only can be on at any one time. This means that each section of the board can be supplied from its own transformer or the whole of the board can be supplied from either transformer, thus limiting the potential fault K.V.A. Except for one emergency lighting switch, all outgoing switches on the left-hand section of the board control power circuits, while those on the right control heating, lighting, and some power. The heating circuits are controlled by a group of switches at the end of the board remote from the incoming unit and are metered to obtain the heating energy consumption. Metering equipment is also provided for the lighting load, and as the total incoming energy consumption is also measured it follows that the consumption for power, lighting, and heating is known separately.

Distribution from the main switchboard throughout the factory is by means of P.I.L.C.S.W.A. cables which run in cable racks through the air duct below the central corridor on the ground floor. The lighting cable terminates at a sub-main distribution board, the heating cables at final sub-circuit distribution boards. Power cables terminate either at final sub-circuit distribution boards, at an overhead bus bar system, or in the case of firing machines and auto-exhaust machines which constitute heavy individual electrical loads at the machine control panels. All the distribution boards and control panels are provided with isolating switches at which the P.I.L.C.S.W.A. cables terminate.

A system of overhead steel trunking has been installed on both floors for carrying the final sub-circuit wiring for lighting, heating, and power circuits. All the distribution boards which feed into the trunking are T.P. and N. and on both floors are mounted on frames which are fixed to the centre line of stanchions running lengthways of the building.

Lighting

For natural lighting ample windows are provided on the north side. These are supplemented on the upper floor by rows of patent glazing on each span of roof, and the day-time level of illumination is such that fine assembly work can be carried out when the sky is very overcast without recourse to auxiliary lighting.

The artificial lighting is by fluorescent lamps throughout the factory, with the

Fig. 4. The interior of the factory showing the upper floor.

exception of the mixing and coating rooms, where 200-watt incandescent lamps with flame proof fittings are employed. On the ground floor the laboratories and furnace room are illuminated by Siemens F.T.F.5180 fittings with 80-watt natural coloured instant start lamps. The fittings are suspended from hook bolts in the ceiling. The illumination level is approximately 25 lumens per square foot. Similar arrangements are employed in the glass and chemical stores, but the illumination level is 12.5 lumens per square foot. The 200-watt tungsten flame proof fittings in the mixing and coating rooms give approximately 23 lumens per square foot. The main corridor is lighted by 40-watt natural coloured fluorescent lamps to a normal intensity of 9 lumens per square foot, with alternative pilot lighting giving 3 lumens per square foot. On the upper floor the main manufacturing area is also illuminated by F.T.F.5180 fittings using 80-watt instant start lamps; the fittings are suspended from the roof trusses at a mounting height of 15 feet. Connections are plugged into sockets fitted to the side of the steel trunking so that the fittings can readily be taken down for cleaning. The average intensity is 21 lumens per square foot, but is substantially higher than this when the lamps are new. A good impression of the character of the illumination can be obtained from the accompanying photograph (Fig. 4).

In the conference room a very simple arrangement has been possible. Six lay-lights of narrow reeded glass and each containing two 80-watt natural instant start lamps give approximately 28 lumens per square foot. A similar arrangement has been utilised for the staff dining-room.

The general appearance of the factory is bright, the scheme of decoration being cream walls with a green dado and glossy black doors on the upper floor. For the lower floor the green dado has been omitted so as to avoid reducing the apparent height of the rooms. Machines have been painted to tone in with the general scheme, and in general the vertical surfaces of machines are green and the horizontal surfaces cream.

Other Services

Gas, Air, and Water

In order to give maximum flexibility, the gas, air, and water services are run as ring mains, the ground floor section being carried in a duct adjacent to the north wall and having removable slab covers, while the upper floor sections are carried on the roof trusses. The risers are at the extreme east and west ends. Transverse ducts are provided on the ground floor to carry the branch connections to the furnaces and other gas fired equipment. Chemical effluent is discharged into a covered half channel running lengthwise through the centre of all the laboratories and connecting with a settling and neutralising tank prior to overflowing into the main drain.

Heating

A substantial contribution to space heating comes from waste heat emitted by the manufacturing process, particularly the furnaces on the ground floor and the tube firing, sealing-in and exhaust machines on the upper floor. It has, therefore, been possible to supply the balance of heat required by electrical means. A preliminary warming of the in-coming air is carried out by a bank of heaters on the ventilating plant and is manually controlled by switching on only as and when required. The main contribution to the auxiliary heat is from thermostatically controlled convector heaters designed and built by the associated company, Alfred Graham and Company. These are provided in greater concentration on that side of the upper floor remote from the machines which contribute waste heat.

Ventilation

This presented a number of interesting problems, each of which required its own solution.

The furnacing of fluorescent powders is accompanied by the evolution of a substantial amount of fumes which are dealt with by hooding the furnaces and drawing the hot air collected by the hoods through fume removal washers by means of centrifugal extract fans. Even so some of the fumes escape the hoods into the room and an ample supply of fresh air is necessary. For this purpose an air duct approximately 11 ft. wide x 4 ft. deep was constructed under the main corridor. Fresh air gains access to this through a louvred opening at the yard end, and is drawn up through hollow vertical piers in each laboratory. Suction is provided by a series of extract fans in the buttresses on the window side so that air is drawn right across the laboratories over a 7 ft. 6 in. brick partition and across the furnace room to the fans. This keeps the atmosphere quite clean and fresh.

Rather different arrangements are provided for the mixing and coating rooms and for the upper floor. For each of these the incoming air is evenly distributed by positive blowers feeding fabric ducts 22 ins. in diameter, which run length-wise through the rooms. Three of these run through the whole length of the top floor and can be seen in the accompanying photograph.

Conclusion

Various other features have been incorporated into the factory, on which it is not possible to dwell in any detail. These include means for the disposal of waste glass from the lamp manufacturing operations and convenient means for transferring heavy machinery from the covered yard to the manufacturing floor.

Arrangements for the welfare of employees have been given careful attention in regard to the planning of facilities of the canteen, cloakroom, and lavatories.

Lectures in Illuminating Engineering

Commencing on October 4, 1949, a course of 10 lectures on Illuminating Engineering will be given by Mr. H. S. Barlow, M.Sc., F.Inst.P., F.I.E.S., and other specialist lecturers, at the South-East Essex Technical College, Dagenham, on Tuesday evenings at 7 p.m.

The lectures will deal with basic units, general principles, sources, fittings, daylight, colour, photometry, testing, and recent developments. The fee for the complete course is £1, and should be forwarded to the Clerk to the Governors at the College before September 25.

The lecturers are all acknowledged experts in their subjects who know how to put over their material in an interesting way. The course should be of great value to students and engineers, whether lighting is the whole or only part of their business.

Scandinavian Lighting Conference

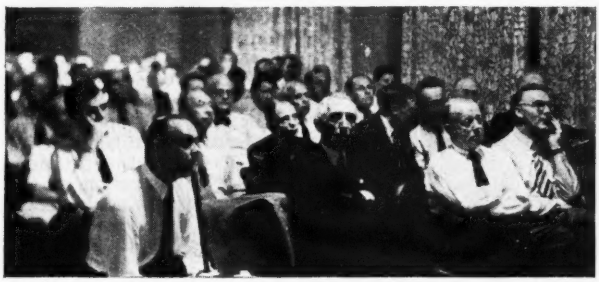
Four-country meeting in Finland

By Gunnar Pleijel

On July 1 and 2, the Finnish Lighting Association held a summer meeting which took the form of a Scandinavian conference at which representatives of the Lighting Associations of Denmark, Norway and Sweden were invited to be present.

Four delegates from each of Denmark and Norway attended the conference. The Danish contingent was made up of Professor G. Weber, Mr. I. Ovesen, Mr. E. Voss and Mr. K. Leoffler whilst the Norwegian representatives were Mr. C. Lindboe, Mr. R. Asperstrand, Mr. A. Lippestad and Mr. A. Piro. These two parties first travelled to Stockholm where they joined forces with the Swedish delegates leaving for Helsingfors on June 29. The Swedish delegates were Mr. Ivar Folker, Mr. G. Nilsson, Professor S. Velander, Professor G. Lovgren, Dr. O. Siljeholm and Mr. Gunnar Pleijel.

On arrival at Helsingfors the delegates were met by the President and Secretary of the Finnish Lighting Association, Mr. Veijola and Mr. Kjaldman who had arranged for the flags of the four participating nations to be flying on the quay. A luncheon reception was held on the twelfth floor of the Torni Hotel from which there was a magnificent view over the town. After lunch whilst the majority of the delegates were making a closer inspection of the town the presidents and secretaries of the four associations held a meeting at which they discussed matters of common interest to the



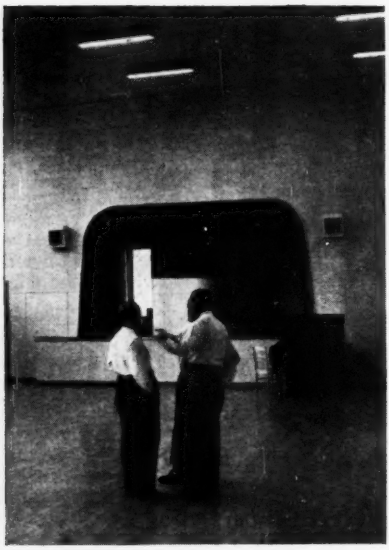
(*Left*) Photograph taken during the course of one of the lectures. Front row, from the left, Mr. Nilsson, Mr. Veijola, Mr. Folker, Mr. Aspestrand.

(*Right*) During the luncheon reception. From the left, Prof. Velander, Prof. Paavola, Mr. Folker, Mr. Veijola, Mr. Lindboe and Mr. Pehrman.

organisation of their associations. In the evening the party went by boat to the island of Langorn where after sampling the swimming and bathing facilities they had a social evening in the old island fortress.

Next morning the party went by coaches from the hotel to Aulanko where the serious business of the conference was to take place. On the way lunch was taken at Ruhimaki and a visit was paid to a glassworks where the delegates were able to see demonstrations of glass blowing, grinding and the manufacture of spectacle lenses.

In the evening the official session began and lectures were given by members of each of the four delegations. The first speaker was Professor M. Paavola of Finland who dealt with the science of lighting. Then Professor Weber of Denmark described the system of lighting education at the Institute of Technology at Copenhagen, illustrating his remarks with a number of slides in colour. Mr. Nilsson then gave a brief survey of lighting progress in Sweden during the last ten years and was followed by Mr. Asperstrand of Norway who deplored the continued lack of co-operation between lighting engineers and architects. Finally, Professor Luneland of Finland, who is a meteorologist, spoke on seasonal daylight variations in Finland.



The hall of the new school at Kivimaa showing the fluorescent lighting in the ceiling.

After this technical session the conference adjourned for a musical evening which, on account of the absence of nightfall in those latitudes, continued well into the following day.

The following morning the coaches conveyed the party to Joutjarvi where, after another bathing session and lunch, the delegates discussed the previous evening's lectures. After this a new school at Kivimaa where modern fluorescent lighting had been installed was visited, the conference returning in the evening to Helsingfors where they spent the night. On the following day the visitors entertained their Finnish hosts to a farewell lunch before leaving for Stockholm in the afternoon.

All who took part agreed that this first Scandinavian lighting conference had been a great success, the delegates having been able to make many personal contacts and to take part in most interesting discussions; added to which, of course, they had been able to see the beautiful country of Finland under the best possible conditions. Meetings of this kind are to be an annual event, the next one to be in Norway.

Small conferences of this kind are always very pleasant particularly if, as it was in this case, plenty of time is allowed for informal discussion, so that by the time the conference is over all the delegates know one another. Not the least interesting point about this meeting is that though representatives of four nations, speaking four languages, were present, each delegate was able to speak in his own tongue and yet be clearly understood by all the delegates.

I.E.S. Leeds Centre

The above I.E.S. Centre are opening their programme for the 1949-50 Session with a public lecture at 7.30 p.m. on October 10, at the Priestley Hall, City Square, Leeds. The lecture, which is entitled "Light, Colour, and the Stage," is to be given by Mr. E. E. Faraday, and is intended to be very colourful with plenty of demonstration showing the beautiful effects which can be obtained with light.

Lighting Exhibits at the Science Museum

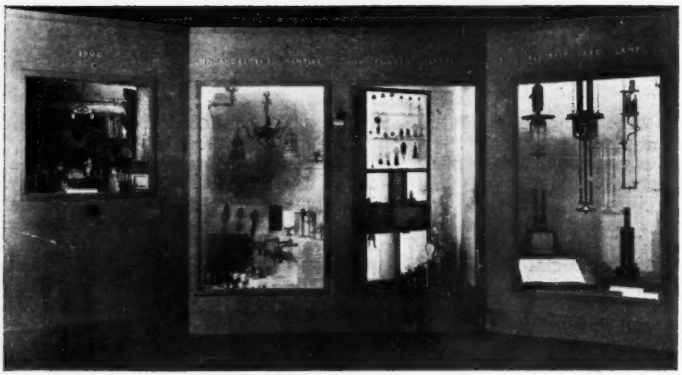
Account of re-arranged sections

The Illumination Collections of the Science Museum consisted, up to 1936, of a great variety of historical specimens, indifferently displayed as only one small room in the old buildings was available, with little to show modern developments. In that year, with the help of E.L.M.A., a special exhibition on "Electric Illumination" was held. It attracted a quarter of a million visitors and contained a number of automatic demonstrations of lighting principles such as the effects of colour, glare, and visual acuity. Space was allocated in the basement, which was not originally intended as display space, for re-building the illumination section of the National Science Collections, and while the historical side was necessarily left in more or less the same state as before, the modern aspects were no longer neglected as the pick of the special exhibition was retained. The new section was opened early in 1939, and was closed for nine years a few months later. During those nine years developments in fluorescent lighting and discharge tubes occurred on such a scale as to make much of what had been modern in 1939 seem obsolescent. In particular two full-scale rooms showing lighting fittings and architectural lighting were no longer presentable.

From May to September, 1948, another special exhibition "Darkness into Daylight," was held at the museum. It was made possible by assistance on the most generous scale from E.L.M.A. and attracted half a million visitors. Here, again, the pick was made available for incorporation in the permanent collections, and plans were made for re-organisation. So far only the historical section and the demonstrations of principles have been re-opened, the latter being virtually unchanged. The discharge lamp and fluorescence sections will follow in a few months' time.

In the historical section it was thought that the old-fashioned type of museum display, showing examples of every conceivable variaion of each type of illuminant was liable to be confusing to the majority of visitors. The collections were therefore weeded out so that each stage of development is now illustrated by a limited number of carefully selected exhibits, brilliantly lit and attractively arranged. As it is not possible to show the exhibits actually alight; the stages are interspersed by dioramas, with push-button lighting, to

General view of lighting exhibits.



Close-up view of some of the cubicles.

convey the atmosphere of the times. The sequence is as follows:—

Primitive lighting, early oil lamps, candles and rushlights, candle fittings, mediaeval diorama, diorama showing oil lamps of 1800, later oil lamps, gas lighting in 1860 (diorama), early gas lights, electric lighting in 1880 (diorama), arc lamps, historical filament lamps, incandescent mantles, gas lighting in 1900 (diorama), manufacture of electric lamps and tungsten filaments, diorama of electric lighting in 1930, lighthouse lamps, stage lighting.

In each cubicle there is a short historical label in large type. The labels for the individual objects are kept very brief and are frequently confined solely to a title. The weeded-out specimens are being retained for eventual embodiment in a reserve collection for the use of students, but to illustrate the development of metal filament lamps, for instance, there are only six examples; the Osmi lamp, the tantalum lamp, the squirted tungsten filament, an early drawn tungsten vacuum lamp, and coiled and coiled coil gasfilled lamps. Other metal filament lamps are exhibited either as decoration or away from the main sequence.

Great attention has been paid to stand design so as to show what, in the main, is a collection of ugly or unattractive objects to the best advantage. Individually some of the exhibits are very pleasing, but most of them are utilitarian rather than artistic. Some of them, such as the Jablochkoff candles, are of great importance, but are in themselves insignificant to look at. In such cases the stand has been designed to give mass to the exhibits. Finally the display has been enhanced by the use of pastel-shade colour schemes in two or more colours, and the choice of a few of the exhibits primarily on account of their decorative value.

The general result is that the newly-arranged section has an air of spaciousness that was missing before and yet contains, in the same area, more exhibition space than formerly. The addition of the dioramas and the division into progressive sections means that the visitor can, within a reasonable time, obtain a much clearer idea of the way in which the history of lighting has progressed. He is led round in a natural sequence without being dragooned, and he finally leaves this section to find that his next natural move is to enter the next section containing demonstrations of lighting principles. In a few months' time he will progress naturally into the discharge tube and fluorescence sections where similar ideas of combining information with attractive methods of display are being worked out. Thus, without compulsion — and without having seen a single example of the standard types of museum display cases —he will, if he is at all interested, receive a concentrated education in the history and development of lighting through the ages up to modern times. He should at least gain some useful impressions, and these should be fortified by the fact that at a number of points in his tour he will have experienced, albeit unobtrusively, some good examples of modern lighting technique.

Simplified Zone Factors for Calculating Flux from a Light Source

By C. E. GREENSLADE

The "Zone Factor" method whereby luminous flux through a zone of sphere is calculated by multiplying the average candle-power in that zone by the appropriate factor is well known. The sphere is divided into zones of equal angle, whether 10 deg. or 5 or 2 deg., but the factors are not very convenient for multiplication. The sum of the factors must come to 6.2832 (2π) however the zones may be arranged.

The calculations can be made more easily if instead of nine equal angle zones of 10 deg. each, six of equal area are chosen with a zone factor of unity with a seventh odd zone, preferably at the pole, to take care of the balance of 0.2832 to complete 2π, the sum of the factors.

Taking the candle-power at the mid-points of the zones either from a polar curve or by measurement, the luminous flux is then one times the candle-power. The mid-points in this case is the angle for which the zone factor becomes equal on both sides up to the limits of the zone, and is not the average of the limiting angles of that zone.

For the lower hemisphere the zones and mid-points are (0 deg. being vertically downwards) as in Table 1.

The mid-points are therefore at approximately 90 deg. $\pm$ 78 with a factor of 0.3 and at angles 90 deg. $\pm$ 61, $\pm$46, $\pm$34, $\pm$24, $\pm$14, and $\pm$5 each with a factor of unity.

For certain fittings with a cut-off just below the horizontal it may be convenient to take the strip starting at 90 deg. for the small factor of 0.28. The zones then become as in Table 2.

Table 1.

Zone	Zone Depth	Factor	Midpoints
(deg.)	(deg.)		(deg.)
90 –80.8	9.2	1	85.4
80.8–71.4	9.4	1	76.2
71.4–61.5	9.9	1	66.5
61.5–50.5	11	1	56.1
50.5–37.3	13.2	1	44.2
37.3–17.2	20.1	1	28.9
17.2– 0	17.2	0.28	12.1

Table 2.

Zone	Zone Depth	Factor	Midpoints
(deg.)	(deg.)		(deg.)
90 –87.4	2.6	.28	89
87.4–78.2	9.2	1	83
78.2–68.6	9.6	1	73.5
68.6–58.4	10.2	1	64
58.4–47	11.4	1	53
47 –32.6	14.4	1	40.5
32.6– 0	32.6	1	23

In the case of assymmetric fittings for street lighting the iso-candle or "onion" diagram can be divided into the same zones instead of being divided at the Russell angles. Each 10 deg. traverse across the strip or zone then represents 10/360 ths. of unit solid angle so that the flux in lumens is 1/36th of the average candle-power in that section. For example, taking, say, the strip 37.3 deg. —50.5 deg. and a traverse from 20 deg. across to 30 deg. with the candle-power at 44.2 deg. elevation on the iso-candle diagram, say, 1,200; the flux for this little bit of the zone would be 1,200 x 1/36 = 33.3 lumens. The division by 36 would normally be done once after the candle-powers for the individual readings have been added up.

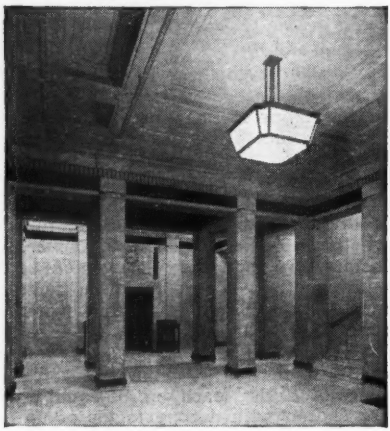
It is hoped that this proposed set of zones with their mid-point angles may help to reduce the labour of calculating the luminous flux from a lamp and its lantern.

New Lighting Installations

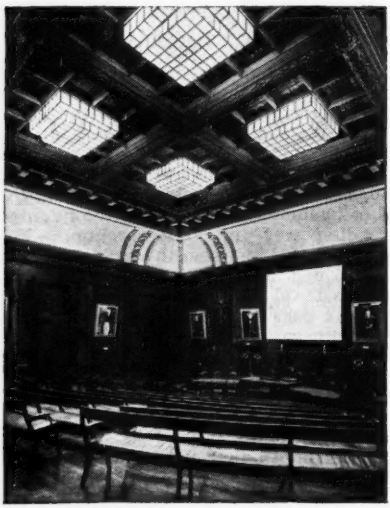
The Institution of Electrical Engineers

An extensive installation of fluorescent lighting using Osram lamps and G.E.C. fittings has recently been completed at the Institution of Electrical Engineers, Savoy Place, London, W.C.2. In several instances decorative fittings designed for the previous tungsten filament lamps have been retained, and considerable savings in power consumption have been effected by the use of fluorescent lamps. In the lecture theatre, for example, the new cold cathode lighting takes some 10 kw. compared with the 21.5 kw. of the tungsten installation it has replaced, with an increase of 30 per cent. in illumination.

A glazed pendant fitting of special design containing 20 2-ft. 20-watt lamps lights the main entrance hall. The lamps are arranged so that the upper ones throw light on to the ceiling, illuminating its decorative features and helping the visitor to appreciate the height and spaciousness of the hall. The eye is directed, also, to the presidents' name panels in the background, illuminated by two 2-lamp "Perspex" enclosed fittings mounted on their sides opposite the panels in positions concealed from the main area of the hall. The illumination in the hall is about seven lumens per sq. ft.



The I.E.E. entrance hall.



Cold cathode lighting in the I.E.E. lecture theatre.

The lecture theatre (in which the 1946 I.E.S. convention meetings were held), opening out of the entrance hall, is lit entirely by cold cathode tubing. The four dropped laylights (made by the G.E.C. many years ago) each now contains 158 ft. of warm white tube in grid formation. In addition the theatre has indirect lighting from a double run of tubing round the cornice which helps to illuminate the lower curve of the decorated ceiling. Each part of the theatre lighting is controlled by a motor-driven dimmer installed in the basement and operated by push-buttons. A low level of illumination can be obtained during the showing of slides or films by using the cornice in a partially dimmed condition alone. The average illumination provided in the theatre in the full-light condition is about 6 lumens per sq. ft. A higher level was considered

Fluorescent lighting applied to motor body building.

undesirable because it would have resulted in excessive brightness contrast due to the dark colour of the panelling and furnishings.

Other parts of the building which have been relighted include the library, the council chamber and the canteen and kitchen. Warm white lamps are used throughout the building, including the offices, a warm light being desirable to harmonise with the subdued colour schemes and the preponderance of dark panelling.

Lighting a Car Assembly Line

The use of fluorescent lighting fittings, set at the correct angle to ensure full light value where it is of most use, has resulted in an installation at the Doncaster works of Messrs. Briggs Motor Bodies, Ltd., with several distinct advantages over the previous tungsten equipment. Installed by the company's own staff it consists of 150 Ekco-Ensign fittings, type FF13, modified for angle use, and using 5-ft. 80 watt lamps.

Chains are suspended at 8-ft. above floor level on both sides of the motor car body assembly lines and the fittings are in continuous rows in the working sections. The need for sufficient even lighting both inside and outside the car bodies, not obtained with tungsten lamps, was an important factor in deciding the height and angle of the fittings. The concentration of light with this fitting, installed end-to-end, results in economical planned lighting, besides having the advantage of easy installation and maintenance.

Industrial Floodlighting

The picture at the top of the next page might at first sight appear to be something of a problem picture. It shows, however, an interesting example of industrial floodlighting. China Clay, the amazing all-purpose raw material used in a hundred and one different ways both in home and industry, forms a very valuable export to hard currency areas such as America, Canada, and Sweden. In the drive for increased exports Messrs. English Clays, Lovering, Pochin and Co., Ltd., started night work at many of their pits, using Metrovick floodlighting to provide the necessary illumination.

Long-range floodlights housing Class B.1 Projector Lamps are used. These units have an effective throw of 400/450 feet, with beam angles varying according to front lens glasses from 15 deg. circular to 38 deg. x 15 deg. rectangular.

Two such units, one of each type, are

Floodlighting in the china clay pits at St. Austell, Cornwall.

used in each pit. The high reflection factor of the white clay is of considerable assistance in providing good seeing conditions. The results have been so satisfactory that additional floods are being installed at other pits.

Lighting in a Pottery

The photograph at the foot of this page shows the decorating shop in Messrs. Booths and Colcloughs modern pottery at Stoke-on-Trent, recently relighted by 102 Revo "Trufolite" reflector fittings, each carrying one 80-watt 5 ft. fluorescent tubular lamp.

The very fine nature of the work carried out in this shop demands even consistency of glareless lighting without producing eye-strain or fatigue, and this has been achieved through the combination of fluorescent lighting and compatible colour scheme for walls and roof. In this particular case, the roof and walls are painted light stone, and the fittings are mounted to give a height of 8 ft. 6 in. to light centres.

The whole installation was planned

Fluorescent lighting in the decorating shop of a pottery.

W. H. Smith's new bookstall at Marylebone Station.

and executed in conjunction with Messrs. Booths and Colcloughs, Ltd., by Alliance Electrical Co., Ltd.

A New Station Bookstall

The opening of W. H. Smith's prototype bookstall at Marylebone Station on July 15 is particularly interesting, for it indicates "the shape of things to come," so far as future W. H. Smith bookstall design is concerned. It has several unique features and is believed to be the only design of its kind in the country.

The construction is of aluminium alloy, satin finish in natural colour, and the architectural features are finished in the same metal. The whole is fabricated in sections for easy and quick assembly or dismantling. The internal fittings are partly constructed of aluminium alloy and partly of plastic.

The shape of the new stall is interesting. It is semi-circular with a fine sweep of counter, and at one end is a special "walk in" book section, where book buyers can examine books without being hustled and jostled by newspaper customers at the counter.

The fascia is a translucent opal panel with inset red plastic lettering and illuminated from behind by fluorescent lighting. The light is reflected down from the underside of the projecting fascia canopy through fins onto the magazine line most effectively. This innovation adds greatly to the attractiveness of the stall.

The illuminated showcases on the counter front are a further innovation. These replace the familiar double-crown poster sites that are the normal feature of W. H. Smith bookstalls. The posters are now accommodated at the side and rear of the stall, in specially constructed frames set on the slant to make for easier reading.

This bookstall has been designed to give a first-class display and service to the travelling public, as well as improved working conditions for the staff behind the counter. In carrying out these objects light plays a considerable part.

Personal

Dr. A. Dresler, formerly of Berlin, has recently taken up an appointment with the Department of Labour and National Service in Melbourne, Australia.

Mr. A. J. Skinner, Branch Manager of Siemens Electric Lamps and Supplies, Ltd., Bristol, recently retired after 46 year's service with the Siemens Companies. His successor is Mr. J. R. Yeates, who joined the company in 1946, after 24 years' service with the Brighton Electricity Supply.

Mr. C. A. Jones, after 19 years with Pearce Signs, Ltd., has now been appointed Manager of the Cold Cathode and Signs Division of Courtney, Pope (Electrical), Ltd.

Street Lighting

High - street, Watford (right), has been equipped with fluorescent lighting. Twelve "Mazda" fluorescent lanterns are used, each housing three 80 watt 5 ft. fluorescent lamps. The lanterns are mounted on square concrete columns of pleasing daytime appearance, at a height of 25 ft., and spacing is in staggered formation at an average distance of 120 ft. The scheme provides approximately 5,600 lumens per 100 ft. linear of roadway.

An installation of eight "Sol-etern" lanterns, manufactured by Revo Electric Co., Ltd., has been put into operation at Corby. Each lantern has two 5 ft. 80 watt warm - white fluorescent lamps, and the scheme is planned in accordance with the principles of the M.O.T. Final Report to provide 4,280 lumens per 100 ft. linear of road. Excellent visibility and uniformity of brightness is obtained, and the total load for the complete installation is only 1.54 kw.

The illustration on the right shows a section of High-street, Bognor Regis, where fluorescent lighting has recently been installed. The installation consists of 12 G.E.C. "Four-Eighty" lanterns, each containing four Osram 5 ft. 80 watt Daylight fluorescent lamps and their associated auxiliary gear. The installation was planned by the G.E.C. in collaboration with Major C. F. Green, of the Southern Electricity Board. The installation provides about 7,600 lumens per 100 ft. of carriageway, but arrangements are made for half-lighting after midnight.

Courses in Illuminating Engineering

Courses for the City and Guilds Certificates in Illuminating Engineering which have been arranged for the coming winter are as follows: —

London

Borough Polytechnic (*Borough High Street, S.E.*1).

A course for the Final Certificate (either Section "A" or "B," according to the demand) will be held on Mondays from 2-4.30 p.m. and 5.30-8 p.m.

Two courses have been arranged for the inter. exam. (i) a day course on Thursdays, and (ii) an evening course, with classes on Tuesdays and Fridays, as follows:—

(i) Thursdays, 2-4.30 p.m. and 5.30-8 p.m.
(ii) Tuesdays and Fridays, 6.30-9 p.m.

Students may sign on for these courses at the Polytechnic between 5.30-8 p.m. on September 19, 20 or 21. Classes will begin during the following week and continue until the C. and G. exams. in May, 1950.

Northampton Polytechnic (*St. John Street, E.C.*1).

Part-time day and evening courses will be conducted as follows:—

Final (Section "A").

(i) Thursdays, 2-5 p.m., 6-8 p.m.
(ii) Tuesdays and Wednesdays, 7-9.30 p.m.

Inter.

(i) Wednesdays, 2-5 p.m., 6-8.30 p.m.
(ii) First year course, Mondays and Thursdays, 7-8.30 p.m.
(iii) Second year course, Mondays and Wednesdays, 7-9.30 p.m.

New students may enrol any time on September 12 or 13. Students continuing their studies should enrol between 6.30-9 p.m. on September 14, 15, or 16. The courses begin in the week commencing September 26.

Cardiff

Cardiff Technical College (*Cathays Park, Cardiff*).

Arrangements are being made for courses for both the Inter. and Final examinations at Cardiff, and it is hoped that the Final course will be able to cover both Sections 'A" and "B," the courses beginning in the first or second week of September. The Inter. course will be for two years, the Final for one, i.e., taking the Final examination next May.

The dates and times of classes are not yet available but will be on one afternoon and one evening per week, arranged to suit the students as far as possible.

Enrolment is during the first week in September. The fee for each of the courses is £2 10s. per session, including a 10s. laboratory fee, which is returnable.

Further particulars may be obtained from Mr. N. D. Houston, Secretary of the Cardiff Centre, or from Dr. Somerville Vernon, Physics Dept., Technical College, Cathays Park, Cardiff.

Liverpool

Bootle Technical College (*Balliol Road, Bootle, Liverpool*, 20).

The course arranged at Bootle is the second year of a two-year course for the Inter. examination. The course begins on September 26 and classes will be held on Mondays, Wednesdays and Fridays until May next year, when the students will sit for the Inter. examination.

The fee for the course is 15s. New students may enrol on September 15 and 16; second-year students should enrol between 6-8 p.m. on the 12th or 13th. Further details may be obtained from J. Cormack, Esq., Principal of the College.

Manchester

Manchester College of Technology (*Sackville Street, Manchester*).

A course has been arranged for the Final, Sections "A" and "B," though students wishing to take Inter. may attend the course if they wish. The course will begin in October and classes will be held on Mondays from 5-6.30 p.m., and on Tuesdays from 5-7.30 p.m. The fee for the course is three guineas. Further details may be obtained from Mr. W. E. Ballard, Secretary of the Manchester I.E.S. Centre or from Dr. Lipson at the College.

Glasgow

Stow College School of Engineering.

Once again this College is arranging a course which will probably be for the Inter. exam. The course will be an evening one starting on September 19. For students under 18 the course is free; for those over 18 the fee is 5s. Students may enrol during the period September 12-15. Further details may be obtained from the Director of Education, 129, Bath Street, Glasgow.

REVIEWS OF BOOKS

Building for Daylight. By R. Sheppard and H. Wright, with an introductory note by John Gloag. (Allen and Unwin pp. 91, with many illustrations. Price 21s.)

It is a little difficult to review this book in relation to its title, because it is essentially concerned with the use of glass in buildings. The authors freely acknowledge their indebtedness to a large firm of glass manufacturers, and as a guide to the use of the very wide range of glass types supplied by this firm, they serve a useful purpose. As a text book on modern methods of building for daylight, the book is not complete or representative of progressive thought, but it can be read for its general interest, and especially for the pleasure given by the sketches.

There is an introduction on the history of the use of glass in buildings, contributed by John Gloag, which is perhaps the most instructive part of the book for the general reader. It is difficult to conjecture the functions of the I.E.S. had the window tax, imposed in 1697, not been repealed in 1851. The tax did not operate on low-rent houses, apparently, so that it was only the rich man who had to pay for his light.

The main part of the book illustrates types of layout for factories, office blocks, flats, and so on, to give good daylight penetration. There is little attempt at a formal treatment, and recent work on Town Planning in relation to daylight is not discussed. Methods of calculation of daylight penetration in various types of building are mentioned, and the effect on daylight penetration of the placing of windows are shown in a series of diagrams. Unfortunately these diagrams employ a linear rather than a logarithmic scale of daylight factor, so that little true impression of the effects of changes in window design can be obtained directly from them.

There follows a very detailed description of the uses of glass in almost every conceivable place in a building, a veritable *embarras de richesses*.

The Rise of the Gas Industry in Britain, by Dean Chandler and A. Douglas Lacey. (British Gas Council 1949, pp. 156, with 51 illustrations. Price 15s.)

In "The Rise of the Gas Industry in Great Britain," Dean Chandler and A. Douglas Lacey have produced an authoritative and interesting survey of the birth of the Gas Industry and the first 50 years of its progress.

After a description of the earliest known experiments with coal gas, the authors describe the work of William Murdoch, the "Father of the Gas Industry," and the grandiose schemes of F. A. Winsor who helped to bring gas to the notice of the public. Other early pioneers, Clegg, Accum, and Malam among them, are noticed, from which point the book deals with early processes for the manufacture and purification of gas.

Finally the first experiments in the use of gas for cooking and space heating are described, with the gradual change of emphasis from lighting to heating.

Among the interesting facts brought out by the researches of the authors, is that Pall Mall can no longer maintain its claim to have been the first street lit by gas. They have proved that, a few months earlier, in the summer of 1807, Golden-lane, E.C., was lit by gas, largely owing to the enterprise of the proprietor of the Golden Lane Brewery.

The book is fully illustrated by reproductions of early drawings, photographs, and engravings, and also contains two coloured plates and a plan. Extensive appendices reprint a number of articles and pamphlets dealing with the early history of the industry.

Engineering and Marine Exhibition

The above exhibition is to be held at Olympia from August 25 to September 10. As in previous years an official visit by the Illuminating Engineering Society will be made, and this year will be on Tuesday, September 6. Tickets, which will admit two persons to the exhibition free of charge on any single day, may be obtained from the I.E.S. Secretary, 32, Victoria-street, S.W.1.

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FESTIVAL OF BRITAIN. The Council of Industrial Design has opened a 1951 Stock List, to which it invites manufacturers to send photographs or drawings of their best products.—Address to Stock List, Council of Industrial Design, Tilbury House, Petty France, London, S.W.1.

THE PUBLIC WORKS AND MUNICIPAL SERVICES CONGRESS, 1950

(Combining the Public Works, Roads and Transport Congress and the Public Health and Municipal Engineering Congress)

PRIZE COMPETITION FOR PAPERS

The Congress Council has decided to offer prizes for papers which are submitted for discussion at the Congress to be held in November, 1950.

The prizes will be as follows:—

1st Prize—Gold medal and one hundred guineas
2nd Prize—Silver medal and fifty guineas
3rd Prize—Bronze medal and twenty guineas
4th Prize—Ten guineas

with an additional award of five guineas for every other paper selected for discussion at the Congress as a result of this competition.

The subject of papers must come within the scope of Public Works and Municipal Services.

All papers for competition must be received by the undersigned by noon on Saturday, 31st December, 1949.

Intending competitors should obtain a copy of the rules of the competition from the undersigned.

C.W. SCOTT-GILES,
Secretary.

84, Eccleston Square,
London, S.W.1

July, 1949

The EDITOR Replies

Our attention has been drawn to a note, in a recent issue of a trade journal, concerning a new light diffusing screen which can be fitted to reflectors used in direct lighting. The note begins with the statement, "It is well known that artificial light is one of the major causes of eyestrain." This is the kind of loose statement that the uncritical accept without question and the prejudiced hail as confirming their own views. If it had been said that *badly designed* artificial *lighting* is one of the major causes of eyestrain we would agree, but such a statement is very different from the one with which we quarrel. Furthermore, it is well known that *natural* light "causes" eyestrain if we persist in trying to do fine work when there is inadequate daylight for the purpose. It is certainly not true that artificial light *as such* is either a major or minor cause of eyestrain.

One of our readers complains of the lack of technical data concerning the flux distribution and luminous efficiency of decorative lighting units, particularly those which are now available incorporating fluorescent tubes. Such units are rapidly coming into use for the lighting of offices and public buildings, but makers do not publish sufficient information about them to meet the needs of lighting designers. The iso-illumination curves which have been published for fluorescent tubes in industrial trough reflectors are very useful, and similar diagrams referring to other fluorescent units, including those for wall instead of ceiling mounting, would be welcome. Passed to you, Fittings Manufacturers!

Another reader asks why more detailed information is not given about the performance of new lighting installations mentioned in our pages. Also, he thinks descriptions of new installations should include an analysis of the visual tasks for which they have been designed. Space permitting, we are always ready to publish more informative particulars of interesting installations—if we can get them! For these particulars we are necessarily dependent upon the designers of installations, and we welcome from them concise and instructive accounts of installations they have planned, especially if some noteworthy improvement upon current lighting practice is claimed.

A correspondent expresses the hope that the forthcoming Festival of Britain will be characterised by exemplary interior as well as by spectacular lighting. He points out that one way of marking the Festival throughout Britain would be by flood-lighting buildings of civic and historical importance in our principal towns and cities. We do not know what is contemplated in the way of festive lighting, but certainly hope the organisers of the Festival will take the best advice on this very important matter.

While we are on the subject of "illuminations," no doubt those of our readers who have been holidaying in some of our popular seaside resorts will have derived no little pleasure from the gay lighting which at long last has been restored to these "ministers" of health. What with

> 'The sun whose rays
> Are all ablaze
> With ever-living glory"

and the cheery coloured lights when the sun has gone to rest, 1949 holidays will be memorable for many of us.

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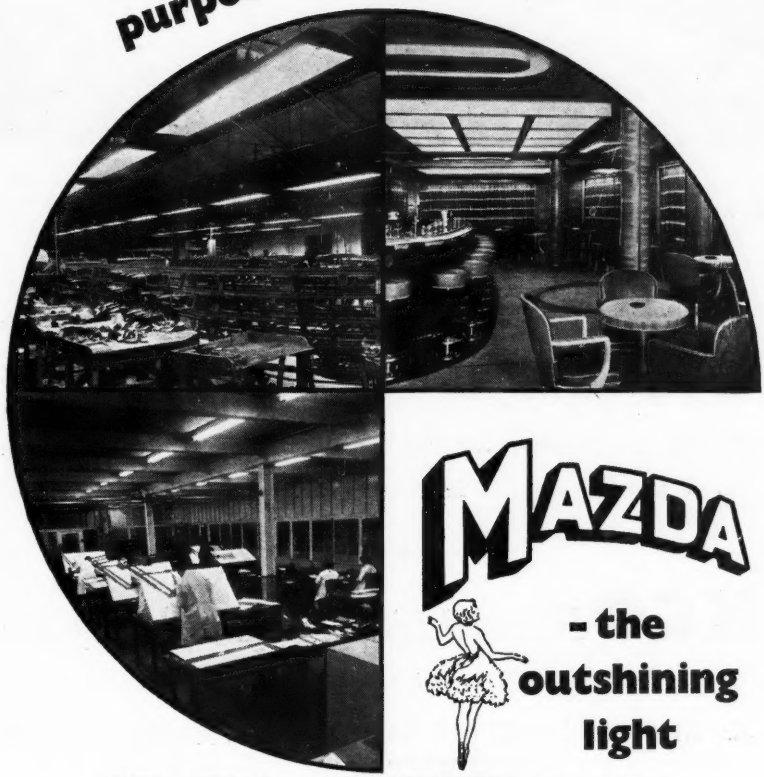

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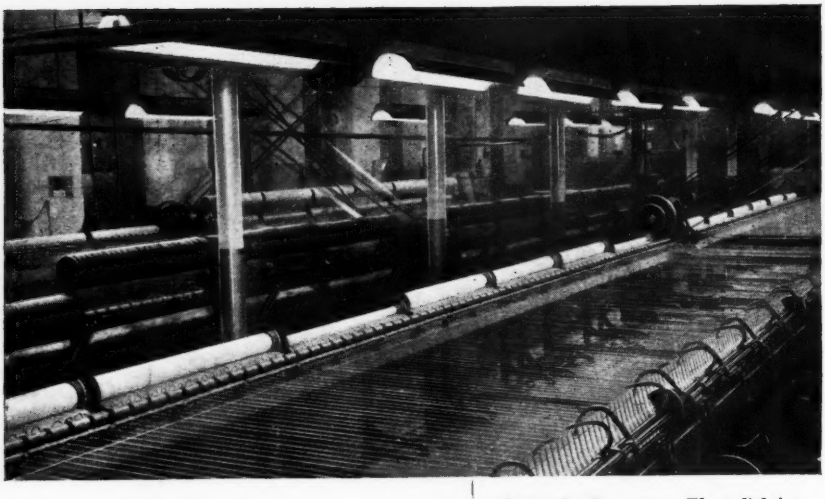

One of the many Ekco lighting installations aiding productivity in the Textile industry. (Photo by permission of Arthur Lawton).

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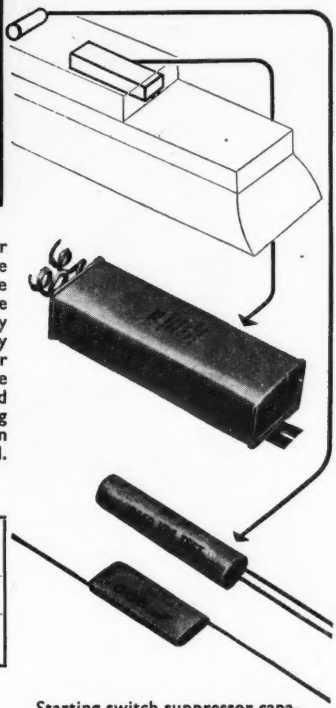

● Fluorescent lighting loads seldom have a power factor better than ·5 and Supply Authorities are stipulating a minimum value of ·8 to reduce the losses that normally occur in uncorrected discharge lighting. This minimum can be met and frequently bettered with T.C.C. Fluorescent capacitors. They are "Visconol" filled for greater stability under conditions of electrical stress or rapid temperature rise, and have been especially designed for long and trouble-free service in fluorescent units. Soldering tags or twin insulated leads can be supplied and an internal discharge resistor can be fitted if required. Maximum ambient working temperature 60° C.

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Capacitance in MFDS.	L.	W.	D.
3·0	5 3/16"	2 1/16"	1 1/16"
3·5	6 7/16"	2 1/16"	1 1/16"
7·0	4 3/4"	3 1/16"	2 1/16"

(Capacitance tolerance ±5%)

FOR 400 VOLTS, AS ABOVE			
Capacitance in MFDS.	L.	W.	D.
3·5	5 13/16"	2 1/16"	1 1/16"
7·0	4 13/16"	3 1/16"	1 1/16"
7·0	11 1/4"	2 1/16"	1 1/16"

(Capacitance tolerance ±5%)

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Capacitance in MFDS.	Rectangular Metal Case with Rolled Seams			Cylindrical Aluminium Cans with Twin Tags	
	L.	W.	D.	L.	Dia.
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3·0	3 1/4"	2 1/16"	1 1/16"	4 1/2"	1 1/4"
3·25	3 1/4"	2 1/16"	1 1/16"	2 11/16"	1 3/4"
4	4 1/2"	2 1/16"	1 1/16"	4 1/2"	1 1/4"
7	5 1/2"	2 1/16"	1 1/16"	4 1/2"	2"
8	4 1/2"	3 1/16"	1 1/16"	4 1/2"	2"
8	4 1/2"	1 1/8"	1 1/8"		

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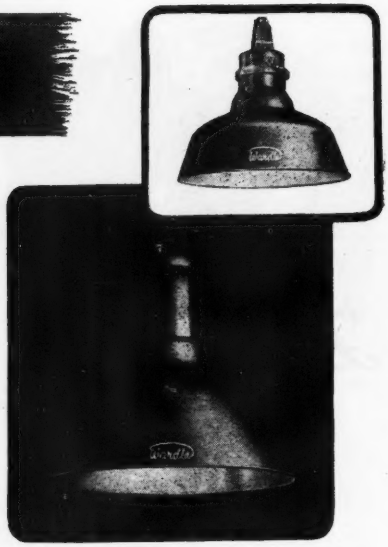

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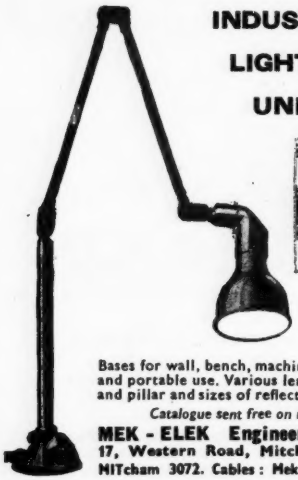

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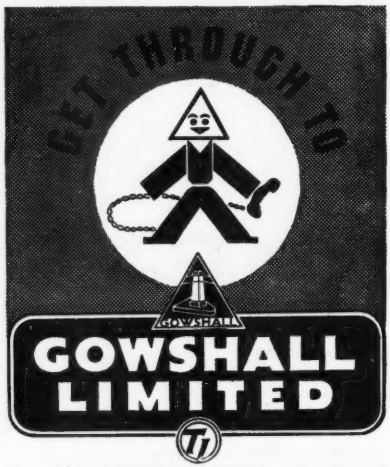

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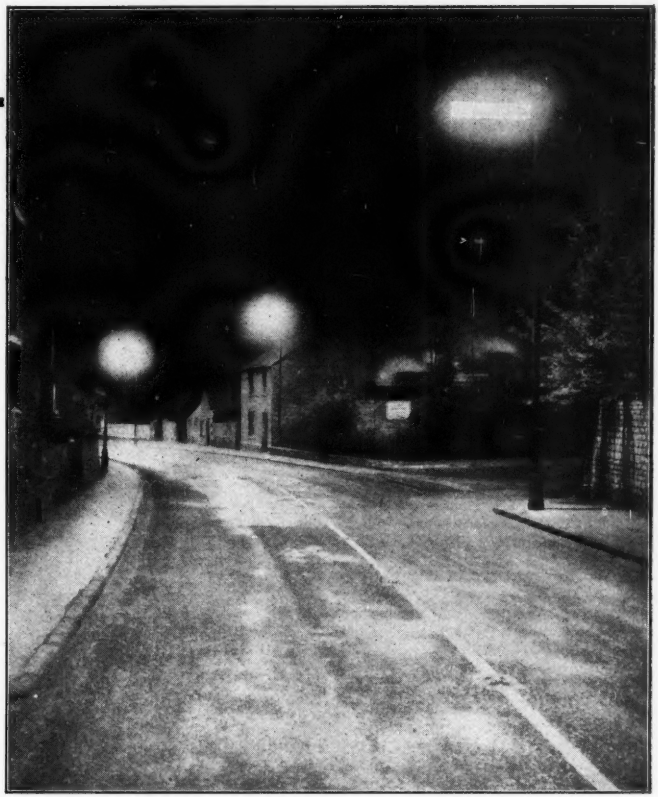

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